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Session LC25 - Tunneling in High-Tc Superconductors I.
ORAL session, Tuesday afternoon, March 23
Room 171W, GWCC

[LC25.03] Quasiparticle Tunneling and Andreev Reflection Study of the Pseudogap in Underdoped La 2-xSr xCuO 4 and YBa 2Cu 3O 6+x

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Scanning tunneling and point-contact spectroscopy measurements are performed on epitaxial-film and single-cristal samples of underdoped La_2-xSr_xCuO_4 and YBa_2Cu_3O_6+x to study the pseudogap characteristics as a function of temperature. The measurements are made between 4.2K and 100K, to understand how the size, symmetry, and character of the superconducting order parameter evolve through the critical temperature T_c and below the pseudogap temperature T*. In particular, the 2\Delta_0/k_BT_c and 2\Delta*/k_BT* ratios are determined, where \Delta_0 and \Delta* are the respective gap-maxima. The occurrence of a zero-bias peak in the tunneling conductance is interpreted as a signature of d-wave pairing symmetry, while an Andreev-reflection behavior in the point-contact spectra is understood as a direct manifestation of the particle-particle nature of the pseudogap. The results are discussed in terms of recent theoretical models, including pair-density fluctuations and Bose-Einstein condensation of pre-formed pairs.

superconduction

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